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(54) ROTATING CONNECTION BLOCK FOR ASSEMBLY BLOCK TOY

(57) Disclosed is a rotary connection block for an assembled block toy. The rotary connection block for an assembled block toy include a block body having a female link assembled with a male link of a unit block on a rear surface thereof and having an upper body and a lower body spaced apart from each other on the rear surface thereof such that the upper body and the lower body extend forward in parallel to each other; a swing member inserted into a space between the upper body and the lower body and having a male link assembled with a female link of a unit block on a front surface thereof; and a shaft member vertically coupled to the upper body, the lower body, and the inserted swing member to couple the swing member to the block body in a way that the swing member is horizontally rotatable.

According to the rotary connection block for an assembled block toy, since unit blocks can be assembled to correspond to the shape of an object to be formed while being rotated at various angles in an assembly process, more various objects can be easily assembled

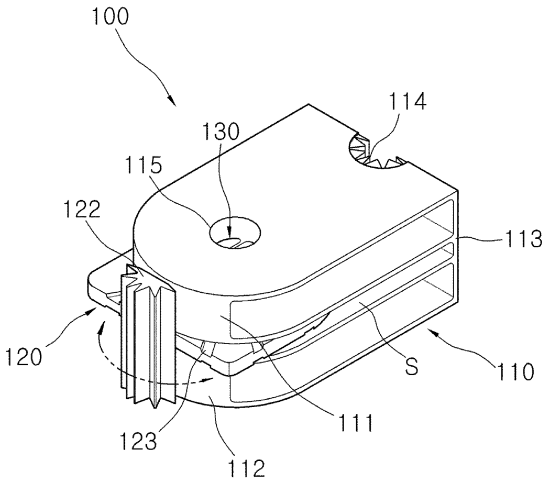

Fig. 1

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Description

[Technical Field]

[0001] The present invention relates to a rotary connection block for an assembled block toy, and more particularly to a rotary connection block for an assembled block toy by which various types of objects or rotatable objects can be easily formed by assembling rotating unit blocks connected to each other at various angles.

[Background Art]

[0002] In general, an assembled block toy is configured to assemble a plurality of unit blocks having various shapes to form an arbitrary object. Since such an assembled block toy allows children to repeatedly assemble various objects through assembly and disassembly thereof according to imagination of the children and improves creativity and imagination of the children in the process of assembling objects, it is widely used for the purpose of education as well as for amusements of infants or children.

[0003] FIG. 16 shows an example of an assembled block toy according to the related art. The assembled block toy according to the related art includes unit blocks each having bosses 1 on an upper surface thereof and recesses into which the bosses 1 may be inserted on a bottom surface thereof, and a plurality of unit blocks are assembled by inserting the bosses of the unit blocks located on the bottom thereof into the recesses on the top thereof to form various objects.

[0004] However, since the block toy is mainly assembled by vertically stacking unit blocks, it is so unnatural to connect and assemble the unit blocks on a plane that the types of assembled objects are limited and it is also difficult to realize various objects.

[0005] FIG. 17 shows another example of an assembled block toy according to the related art. The block toy according to the related art includes unit blocks each having saw-toothed male links 2 and female links 3 on side surfaces thereof which can be engaged with each other as well as bosses 1 on an upper surface thereof and recesses on a bottom surface thereof. Since it is so natural to assembly the unit blocks laterally and horizontally as well as vertically that various objects can be easily formed as compared with the block toy shown in FIG. 16.

[0006] However, since the assembled block block also cannot be rotated once one unit block is assembled in another one, there is still a limit in expressing various objects and the shape of the completely assembled object cannot be deformed at all. Thus, rotatable objects, for example, a structure such as a fire truck or a crane, and rotatable arms or legs of a robot or an animal cannot be effectively formed.

[Disclosure]

[Technical Problem]

[0007] The present invention has been made in an effort to solve the above-described problems, and an object of the present invention is to provide a rotary connection block for an assembled block toy by which an assembly form of blocks can be freely deformed by connecting unit blocks such that the unit blocks can be rotated at various angles, allowing assembly of rotatable objects while realizing various objects.

[Technical Solution]

[0008] In order to solve these problems, according to an aspect of the present invention, there is provided a rotary connection block for an assembled block toy, including: a block body having a female link assembled with a male link of a unit block on a rear surface thereof and having an upper body and a lower body spaced apart from each other on the rear surface thereof such that the upper body and the lower body extend forward in parallel to each other; a swing member inserted into a space between the upper body and the lower body and having a male link assembled with a female link of a unit block on a front surface thereof; and a shaft member vertically coupled to the upper body, the lower body, and the inserted swing member to couple the swing member to the block body in a way that the swing member is horizontally rotatable.

[0009] A plurality of recesses are radially formed on at least one of upper and lower surfaces of the swing member at a predetermined angular interval about the shaft member, and angular adjusting bosses selectively inserted into and stopped by the recesses when the swing member is rotated are formed in at least one of the upper body and the lower body.

[0010] Front end portions of the upper body and the lower body and a rear end portion of the swing member are formed in a symmetrically semicircular shape about the shaft member.

[0011] According to another aspect of the present invention, there is provided a rotary connection block of an assembled block toy, including: a block body having a horizontal space therein, having a shaft hole communicated with the horizontal space at a center of an upper end thereof, and having a horizontally formed female link assembled with a male link of a unit block at a lower end thereof; and a rotary member having a plate member rotatably accommodated in the horizontal space, a shaft member passing through the shaft hole at a center of the plate member and protruding upward, and a male link assembled with a female link of a unit block and horizontally formed at an upper end of the shaft member passing through the shaft hole.

[0012] A plurality of recesses are radially formed at a lower end of the plate member at a predetermined an-

gular interval about the plate member, and angular adjusting bosses selectively inserted into and stopped by the recesses when the plate member is rotated are formed on a lower surface of the horizontal space.

[0013] A front side of the horizontal space is opened such that the plate member is inserted into and accommodated in the horizontal space, an insertion passage communicated with the shaft hole is formed at an upper end of the block body through cutting such that the shaft member passes through the insertion passage when the plate member is inserted, and stopping steps for preventing separation of the inserted and accommodated plate member protrude from upper and lower surfaces of a front end of the horizontal space.

[0014] A front side of the horizontal space is opened such that the plate member is inserted into and accommodated in the horizontal space, an insertion passage communicated with the shaft hole is formed at an upper end of the block body through cutting such that the shaft member passes through the insertion passage when the plate member is inserted, and stopping bosses for preventing separation of the shaft member when the shaft member passes through the insertion passage and is accommodated in the shaft hole protrude from opposite ends of the shaft member.

[Advantageous Effects]

[0015] According to the rotary connection block for an assembled block toy, since unit blocks can be assembled to correspond to the shape of an object to be formed while being rotated at various angles in an assembly process, more various objects can be easily assembled.

[0016] In addition, since the assembled unit blocks can be variously rotated even after the assembly thereof, rotatable structures such as a fire truck or a crane, and rotatable arms or legs of a robot or an animal, that is, rotatable objects can be easily realized.

[Description of Drawings]

[0017]

FIG. 1 is a perspective view of a rotary connection block for an assembled block toy according to a first embodiment of the present invention;
FIG. 2 is an exploded view of FIG. 1;
FIG. 3 is a sectional view exemplifying a coupling state of a shaft member;
FIGS. 4 to 6 are exemplary views showing in-use states in which unit blocks are assembled and rotated in the rotary connection block according to the first embodiment of the present invention;
FIG. 7 is a perspective view of a rotary connection block for an assembled block toy according to a second embodiment of the present invention;
FIG. 8 is an exploded view of FIG. 7;
FIG. 9 is a view showing an interior of a horizontal space which is obtained by partially cutting away a block body;
FIG. 10 is a side view of a rotary member;
FIG. 11 is a view showing recesses of a plate member (in an overturned state);
FIG. 12 is a view showing a shaft member passing through a shaft hole;
FIG. 13 is a view showing an operation of the rotary connection block due to rotation of the rotary member;
FIGS. 14 and 15 are exemplary views showing in-use states in which unit blocks are assembled and rotated in the rotary connection block according to the second embodiment of the present invention; and
FIGS. 16 and 17 are views showing examples of assembled block toys according to the related art.

[Best Mode]

[Mode for Invention]

[0018] Hereinafter, an exemplary embodiment of a rotary connection block for an assembled block toy according to the present invention will be described in detail with reference to the accompanying drawings.

[0019] The embodiment is provided to more fully describe the present invention to those skilled in the art to which the present invention pertains, and it is noted that the shapes and sizes of elements in the drawings may be exaggerated to emphasize a more clear description.

[0020] Further, in the description of the embodiment, a detailed description of known functions and configurations which are apparent to those skilled in the art to which the present invention pertains will be omitted when they may make the technical feature of the present invention unnecessarily unclear.

[0021] FIGS. 1 to 3 are views showing a rotary connection block for an assembled block toy (hereinafter, referred to as "a rotary connection block") according to a first embodiment of the present invention. Referring to the drawings, the rotary connection block 100 according to the first embodiment of the present invention may include a block body 110, a swing member 120, and a shaft member 130.

[0022] The block body 110 has an upper body 111, a lower body 112, and a rear portion 113. The upper body 111 and the lower body extend forward in parallel from the rear portion 113, and are spaced apart from each other by a predetermined interval such that a space S is defined between the upper body 111 and the lower body 112.

[0023] A female link 114, which can be assembled with a male link of another unit block, is formed at the rear portion 113, and shaft coupling openings 115 in which a shaft member 130 which will be described below can be coupled are vertically formed in the upper body 111 and the lower body 112 at corresponding locations.

[0024] Angle adjusting bosses 116 are formed in at least one of the upper body 111 and the lower body 112. That is, the angle adjusting bosses 116 may be formed only on a bottom surface of the upper body 111 or only on a top surface of the lower body 112, but may be formed on both the bottom surface of the upper body 111 and the top surface of the lower body 112 as shown in FIG. 2.

[0025] The swing member 120 corresponds to a flat plate shape, and is inserted and located in the space S between the upper body 111 and the lower body 112. A shaft hole 121 corresponding to the shaft coupling openings 115 and through which the shaft member 130 passes is formed at a central portion of the swing member 120, and a male link 122 which can be assembled with a female link of another unit block is provided on a front surface of the swing member 120. In this case, the female link 114 and the male link 122 formed in the block body 110 and the swing member 120 are elements for assembly with another unit block, and saw-tooth shapes are formed on an inner surface of the female link 114 and an outer peripheral surface of the male link 122, respectively.

[0026] The swing member 120 has a plurality of recesses 123 on at least one of the upper and lower surfaces thereof. That is, in correspondence to the angle adjusting bosses 116, the recesses 113 are formed on the upper surface of the swing member 120 when the angle adjusting bosses 116 are formed in the upper body 111 and are formed on the lower surface of the swing member 120 when the adjusting bosses 116 are formed in the lower body 112. Further, as shown in the drawings, when the angle adjusting bosses 116 are formed in both the upper body 111 and the lower body 112, the recesses 123 are formed on both the upper and lower surfaces of the swing member 120 to correspond to the angle adjusting bosses 116.

[0027] The recesses 123 are radially formed at a predetermined angular interval about the shaft hole 121, that is, the shaft member 130 passing through the shaft hole 121, the formation angle may be variously adopted within a design range including 30° as shown.

[0028] If the swing member 120 is rotated through the recesses 123 of the swing member 120 and the angle adjusting bosses 116 of the block body 110, the angle adjusting bosses 116 are selectively inserted into and stopped by the radially formed recesses 123 in unit of the rotation angle to maintain the rotation state of the swing member 120 with a certain fixing force.

[0029] As the shaft member 130 vertically passes through the shaft coupling openings 115 of the upper body 111 and the lower body 112 and the shaft hole 121 of the swing member 120 to be coupled thereto, the swing member 120 is coupled to the block body 110 to be horizontally rotated about the shaft member 130.

[0030] The shaft member 130 has a head 131 and a rod 132 extending from the head 131. A tip end of the rod 132 is cut in the middle to be bisected into two sides, and inclined bosses 133 are formed on outer surfaces thereof, respectively. Due to the configuration, as shown in FIG. 3, the bisected tip end of the rod 132 becomes narrower while the head 131 is supported by an inner stopping step 115a of the shaft coupling opening 115 formed in the lower body 112, and after passing through an inner stopping step 115a of the shaft coupling opening 115 formed in the upper body 112, returns to an original shape so that the inclined bosses 133 are stopped and supported by the inner stopping step 115a of the shaft coupling opening 115 formed in the upper body 112. Accordingly, the coupling of the shaft member 130 is completed.

[0031] In this way, the block body 110 and the swing member 120 are coupled to each other through the shaft member 130 so that the swing member 120 may be rotated about the shaft member 130, in which case as shown in FIG. 2, front end portions of the upper body 111 and the lower body 112 and a rear end portion of the swing member 120 may be symmetrically semicircular with respect to the shaft member 130 so that during rotation of the swing member 120, the male link 122 provided on a front surface of the swing member 120 does not interfere with the upper body 111 and the lower body 112 and the swing member 120 itself can be easily rotated while not interfering with the rear portion 113 in the space S.

[0032] The rotary connection block for an assembled block toy according to the first embodiment of the present invention has been described so far, and an operation of the rotary connection block will be briefly described in the following.

[0033] First, as shown in FIGS. 4 and 5, a male link 310 of a unit block 300 to be assembled is inserted into and assembled with a female link 114 formed in a block body 110 of a rotation connection block 100, and a female link 410 of another unit block 400 is fitted with and assembled with a male link 122 of a swing member 120 so that the unit blocks 300 and 400 are assembled with the rotary connection block 100.

[0034] When the unit blocks 300 and 400 need to maintain a predetermined angle according to the shape of the object, the unit block 400 assembled with the swing member 120 is gripped and rotated as shown in FIG. 6. Then, angle adjusting bosses 116 are stopped by recesses at a desired angle after the swing member 120 is rotated, so that the unit blocks 300 and 400 can simply maintain a desired angle. FIG. 6 exemplifies that the swing member 120 is rotated by 90°.

[0035] In the assembly process, a desired object can be formed while an angle between the unit blocks 300 and 400 is adjusted and the assembled object also can be rotated in the same way. Thus, it can be seen that articulates, such as arms or legs, which can be bent or expanded, in particular, when an object such as a robot or an animal is assembled can be efficiently realized.

[0036] Meanwhile, FIGS. 7 to 12 are views showing a rotary connection block for an assembled block toy (hereinafter, "a rotary connection block") according to a second

embodiment of the present invention. Referring to the drawings, the rotary connection block 200 according to the second embodiment of the present invention may include a block body 210 and a rotary member 220.

[0037] A horizontal space 211 is formed in an interior of the block body 210, a front side of the horizontal space 211 is opened, a shaft hole 212 communicated with the horizontal space 211 is formed at an upper end of the block body 210, and an insertion passage 213 communicated with the shaft hole 212 is formed on a front side of the shaft hole 212 through cutting.

[0038] A female link 214 which can be assembled with a male link of another unit block is horizontally formed at a lower end of the block body 210, and angle adjusting bosses 215 are formed in the horizontal space 211, in which case the angle adjusting bosses 215 may be formed on a lower surface of a rear end of the horizontal space 211.

[0039] The rotary member 220 is an element which can be rotated relative to the block body 210, and includes a circular plate member 221 rotatably accommodated in the horizontal space 211, a shaft member 223 protruding upward from a center of the plate member 221 to pass through the shaft hole 212 of the block body 210, and a male link 224 horizontally formed at an upper end of the shaft member 223.

[0040] The plate member 221 may have a circular shape, and is inserted into and accommodated in the horizontal space 211 through the opened front side of the horizontal space 211. The accommodated plate member 221 may be freely rotated in the horizontal space 211, and a plurality of recesses 222 into which the angle adjusting bosses 215 can be selectively inserted are formed at a lower end of the plate member so that rotation of the plate member 221 can be fixed with a predetermined force at various angles.

[0041] The recesses 22 are radially formed at a predetermined angular interval about a center of the plate member 221, the formation angle may be variously adopted within a design range including 30° as shown in FIG. 11.

[0042] If the plate member 221 is rotated through the recesses 222 of the plate member 221 and the angle adjusting bosses 215 formed in the horizontal space 211, the angle adjusting bosses 215 are selectively inserted into and stopped by the corresponding recesses 222 in unit of the rotation angle to maintain the rotation state of the plate member 221 with a certain fixing force.

[0043] The shaft member 223 protrudes upward from a center of the plate member 221 to be rotated integrally with the plate member 211 while passing through the shaft hole 212. When the plate member 221 is mounted, the shaft member 223 passes through the insertion passage 213 formed at an upper end of the block body 210, in which case the shaft member 223 preferably has a width by which the shaft member 223 can pass through the insertion passage 213 and a length by which the shaft member 223 can be rotated in the shaft hole 212 without interference.

[0044] The male link 224 is horizontally formed at an upper end of the shaft member 223 passing through the shaft hole 212, in which case the male link 210 is located at an upper portion of the block body 210, may be assembled with a female link of another unit block, and is integrally rotated together with the plate member 221 and the shaft member 223.

[0045] A support plate 225 fixed to an upper end of the shaft member 223 and supporting the male link 224 with a width larger than that of the male link 224 may be provided at a lower end of the male link 224.

[0046] Meanwhile, as described above, the rotary member 220 is installed in the block body 210 by inserting the plate member 221 through the opened front side of the horizontal space 211 and passing the shaft member 223 through the insertion passage 213, in which case in the installation state, that is, in a state where the plate member 221 and the shaft member 223 are rotatably accommodated in the horizontal space 211 and the shaft hole 212, respectively, a separation preventing unit may be provided to prevent the rotary member 220 from being easily separated from the block body 210.

[0047] As an example of the separation preventing unit, as shown in FIG. 9, stopping steps 216 may be formed on upper and lower surfaces of a front end side of the horizontal space 211, in which case the stopping steps 216 have an arc-shaped cross-section such that when a force is applied to the plate member 221 to press-fit the plate member 221 into the horizontal space 211, the plate member 221 passes through the horizontal space 211, but once the plate member 221 passes through the horizontal space 211, separation of the plate member 221 is prevented by restraining the backward movement of the plate member 221.

[0048] As shown in FIG. 9, a plurality of arc-shaped stopping steps 216 may be arranged to correspond to the circular shape of the plate member 221.

[0049] As another example of the separation preventing unit, as shown in FIG. 12, stopping bosses 223a may be formed at opposite ends of the shaft member 223, in which case the stopping bosses 223a may be formed to have an arc shape as shown such that when a force is applied to the shaft member 223 to pass the shaft member 223 through the insertion passage 213, the shaft member 223 can pass through the insertion space 213, but once the shaft member 223 passes through the insertion passage 213 to be located in the shaft hole 212, separation of the shaft member 223 is prevented by restraining the backward movement of the shaft member 223.

[0050] Meanwhile, in the above-described configuration, both the female link 214 formed in the block body 210 and the male link 224 formed in the rotary member 220 are elements for assembly with other unit blocks, and it should be understood that sawteeth may be formed on an inner peripheral surface of the female link 214 and an outer peripheral surface of the male link 224, respec-

tively.

[0051] The rotary connection block for an assembled block toy according to the second embodiment of the present invention has been described so far, and an operation of the rotary connection block will be briefly described in the following.

[0052] As shown in FIG. 13, the rotary member 220 may be rotated with respect to the block body 210 at various angles in the rotary connection block 200. First, as shown in FIG. 14, a male link of a unit block 300 to be assembled is inserted into and assembled with a female link 214 formed in a block body 210 of a rotation connection block 200 and a female link of another unit block 400 is fitted and assembled with a male link 224 of a rotary member 220 so that the unit blocks 300 and 400 are assembled with the rotary connection block 100.

[0053] When the unit blocks 300 and 400 need to maintain a predetermined angle according to the shape of the object, the unit block 400 assembled with the rotary member 220 is gripped and rotated as shown in FIG. 15. Then, angle adjusting bosses 215 are stopped by recesses 222 at a desired angle after the rotary member 220 is rotated, so that the unit blocks 300 and 400 can simply maintain a desired angle. FIG. 15 exemplifies that the rotary member 220 is rotated by 90°.

[0054] In the assembly process, a desired object can be formed while an angle between the unit blocks 300 and 400 is adjusted and the assembled object also can be rotated in the same way. Thus, it can be seen that articulates, such as arms or legs, which can be bent or expanded, in particular, when an object such as a robot or an animal is assembled can be efficiently realized.

[0055] Although exemplary embodiments of the present invention have been described until now, the scope of the present invention is not limited to the embodiments and the contents of the drawings, but the equivalent configurations corrected or modified by those skilled in the art to which the present invention pertains fall within the scope of the present invention.

Claims

1. A rotary connection block for an assembled block toy, comprising:

   a block body having a female link assembled with a male link of a unit block on a rear surface thereof and having an upper body and a lower body spaced apart from each other on the rear surface thereof such that the upper body and the lower body extend forward in parallel to each other;
   a swing member inserted into a space between the upper body and the lower body and having a male link assembled with a female link of a unit block on a front surface thereof; and
   a shaft member vertically coupled to the upper body, the lower body, and the inserted swing member to couple the swing member to the block body in a way that the swing member is horizontally rotatable.

2. The rotary connection block of claim 1, wherein a plurality of recesses are radially formed on at least one of upper and lower surfaces of the swing member at a predetermined angular interval about the shaft member, and angular adjusting bosses selectively inserted into and stopped by the recesses when the swing member is rotated are formed in at least one of the upper body and the lower body.

3. The rotary connection block of claim 2, wherein front end portions of the upper body and the lower body and a rear end portion of the swing member are formed in a symmetrically semicircular shape about the shaft member.

4. A rotary connection block of an assembled block toy, comprising:

   a block body having a horizontal space therein, having a shaft hole communicated with the horizontal space at a center of an upper end thereof, and having a horizontally formed female link assembled with a male link of a unit block at a lower end thereof; and
   a rotary member having a plate member rotatably accommodated in the horizontal space, a shaft member passing through the shaft hole at a center of the plate member and protruding upward, and a male link assembled with a female link of a unit block and horizontally formed at an upper end of the shaft member passing through the shaft hole.

5. The rotary connection block of claim 4, wherein a plurality of recesses are radially formed at a lower end of the plate member at a predetermined angular interval about the plate member, and angular adjusting bosses selectively inserted into and stopped by the recesses when the plate member is rotated are formed on a lower surface of the horizontal space.

6. The rotary connection block of claim 4 or 5, wherein a front side of the horizontal space is opened such that the plate member is inserted into and accommodated in the horizontal space, an insertion passage communicated with the shaft hole is formed at an upper end of the block body through cutting such that the shaft member passes through the insertion passage when the plate member is inserted, and stopping steps for preventing separation of the inserted and accommodated plate member protrude from upper and lower surfaces of a front end of the horizontal space.

7. The rotary connection block of claim 4 or 5, wherein a front side of the horizontal space is opened such that the plate member is inserted into and accommodated in the horizontal space, an insertion passage communicated with the shaft hole is formed at an upper end of the block body through cutting such that the shaft member passes through the insertion passage when the plate member is inserted, and stopping bosses for preventing separation of the shaft member when the shaft member passes through the insertion passage and is accommodated in the shaft hole protrude from opposite ends of the shaft member.

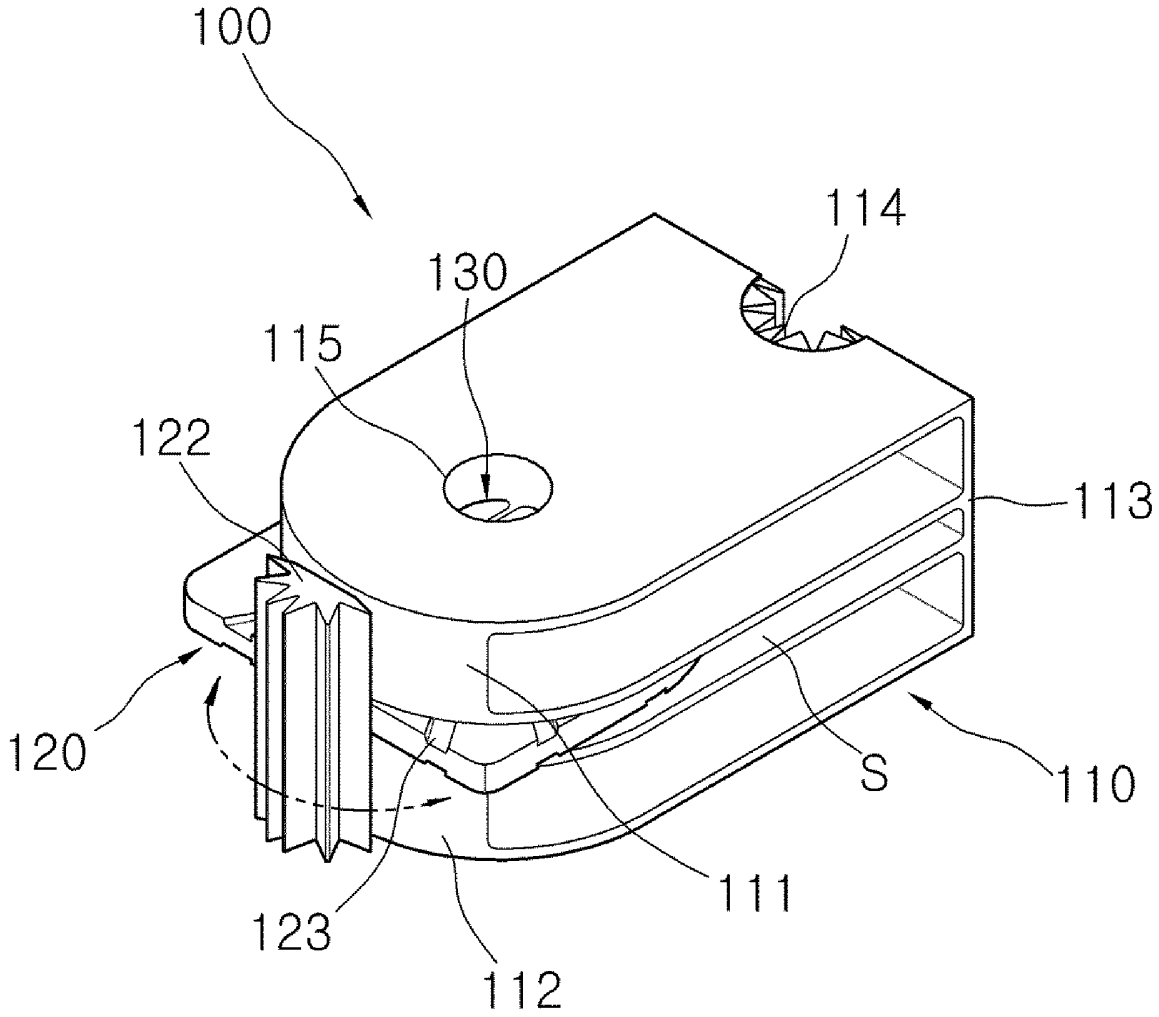

Fig. 1

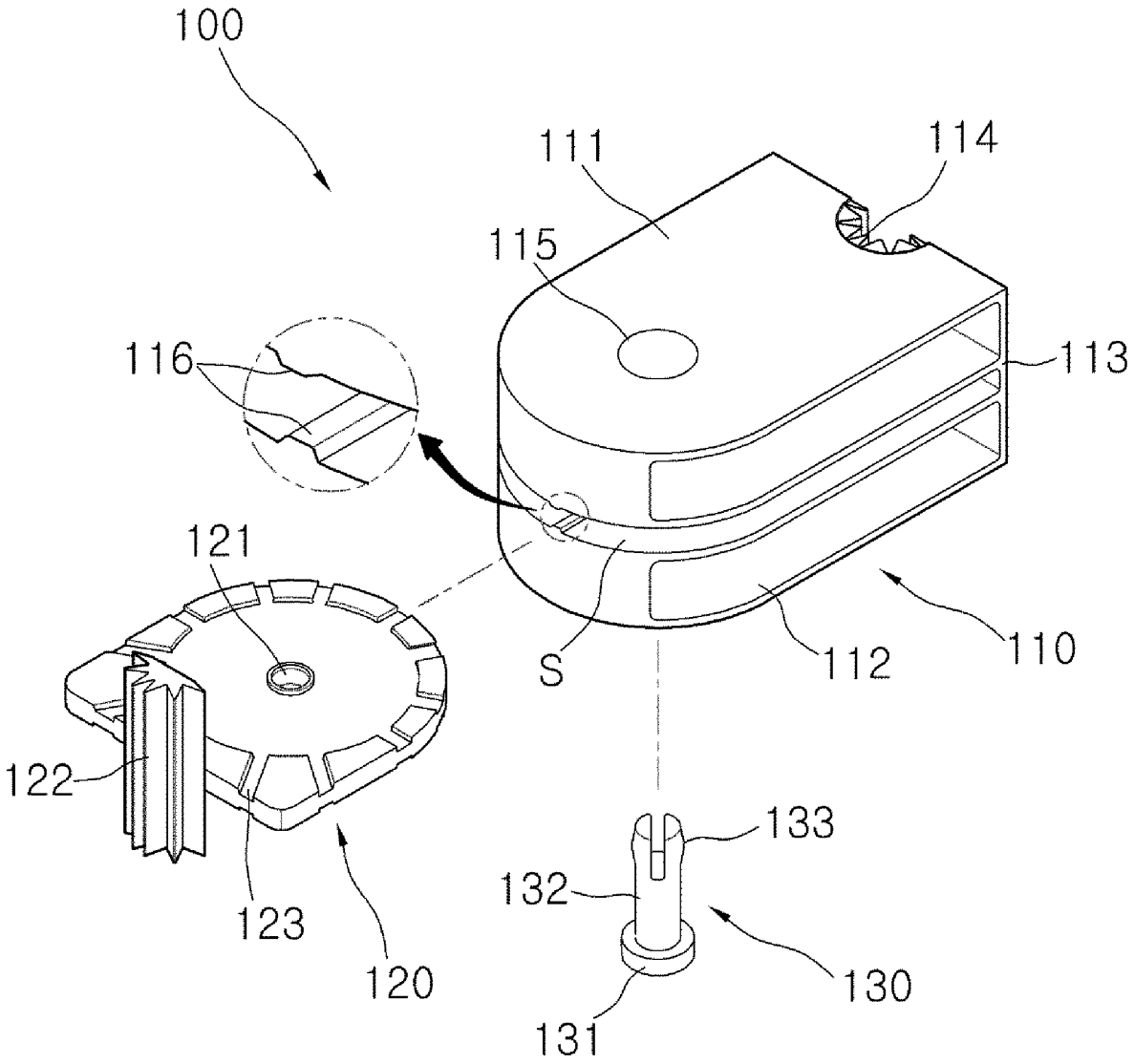

Fig. 2

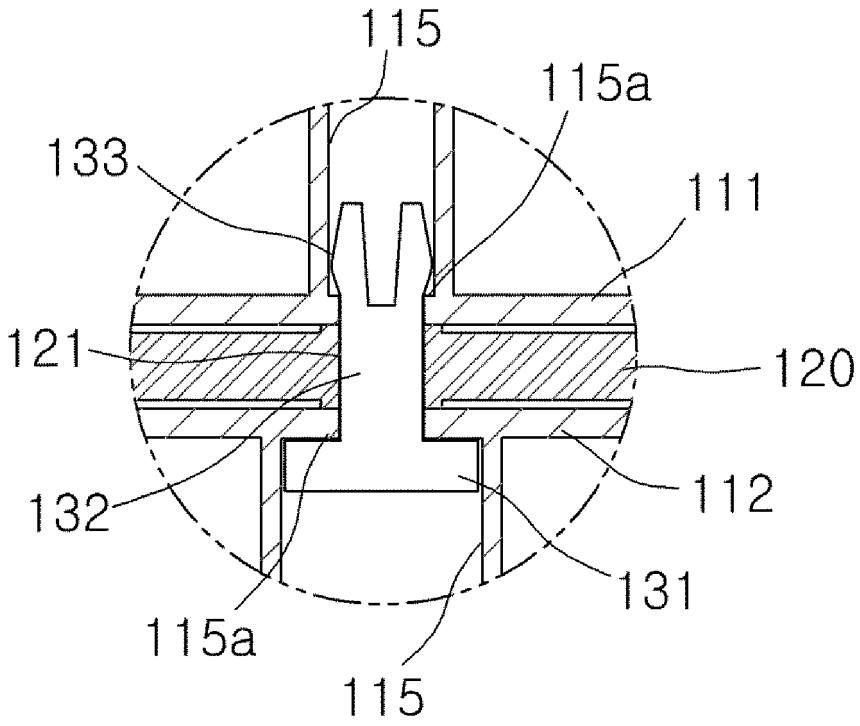

Fig. 3

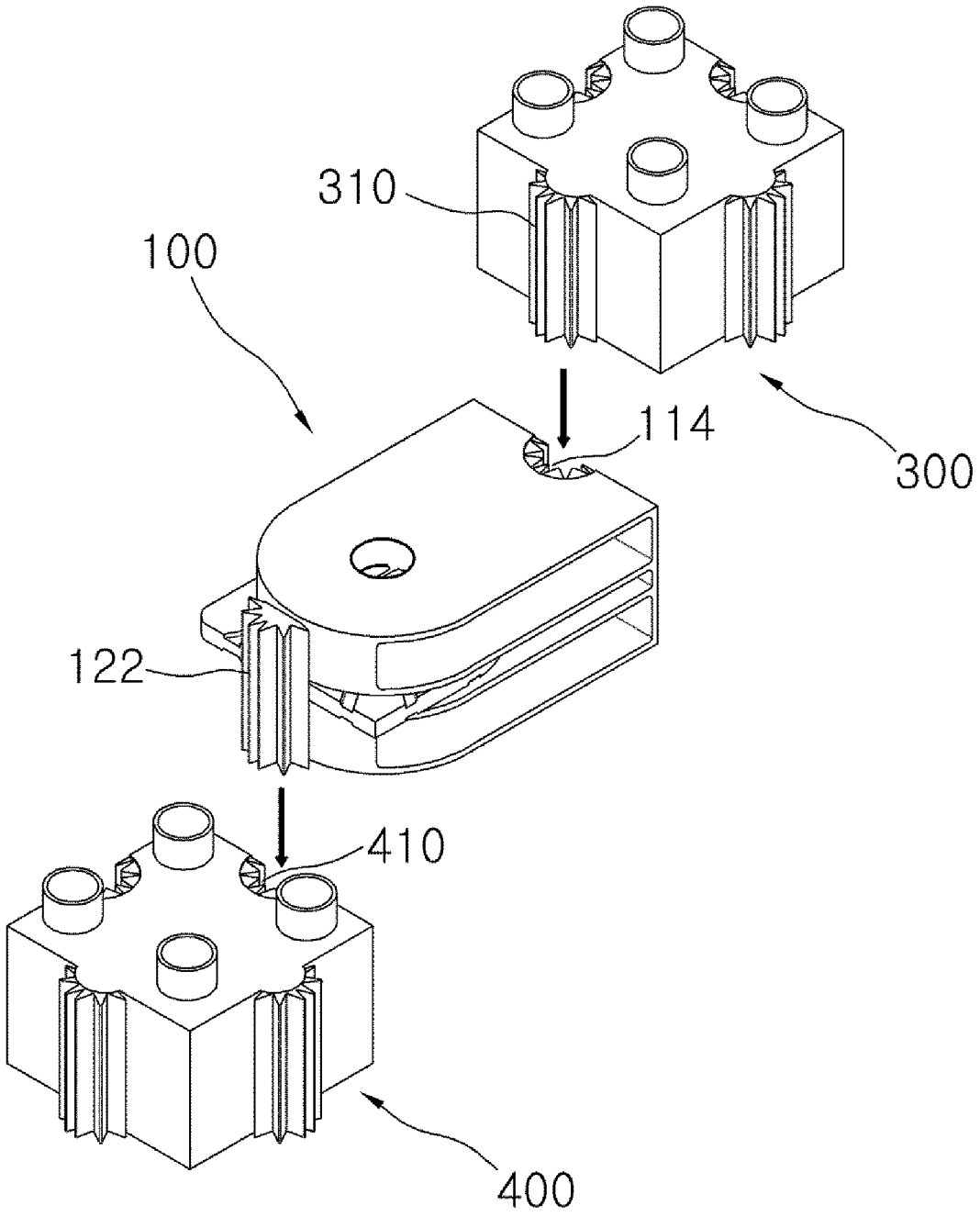

Fig. 4

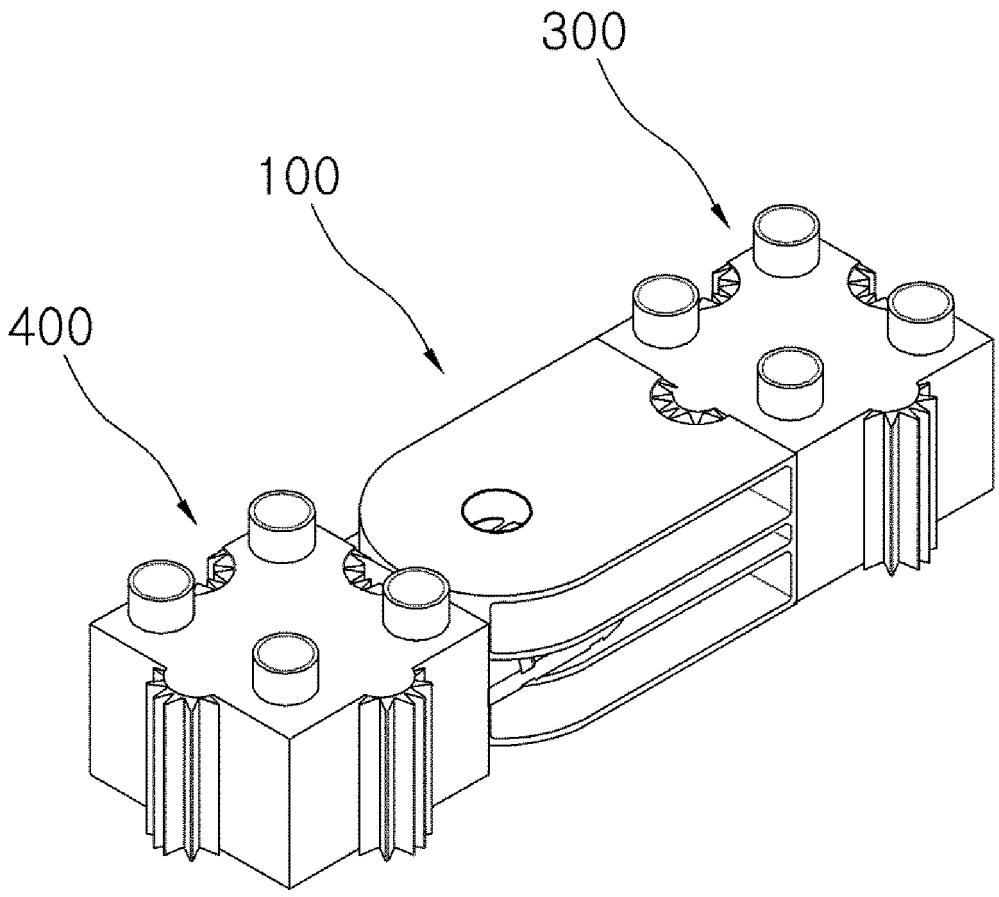

Fig. 5

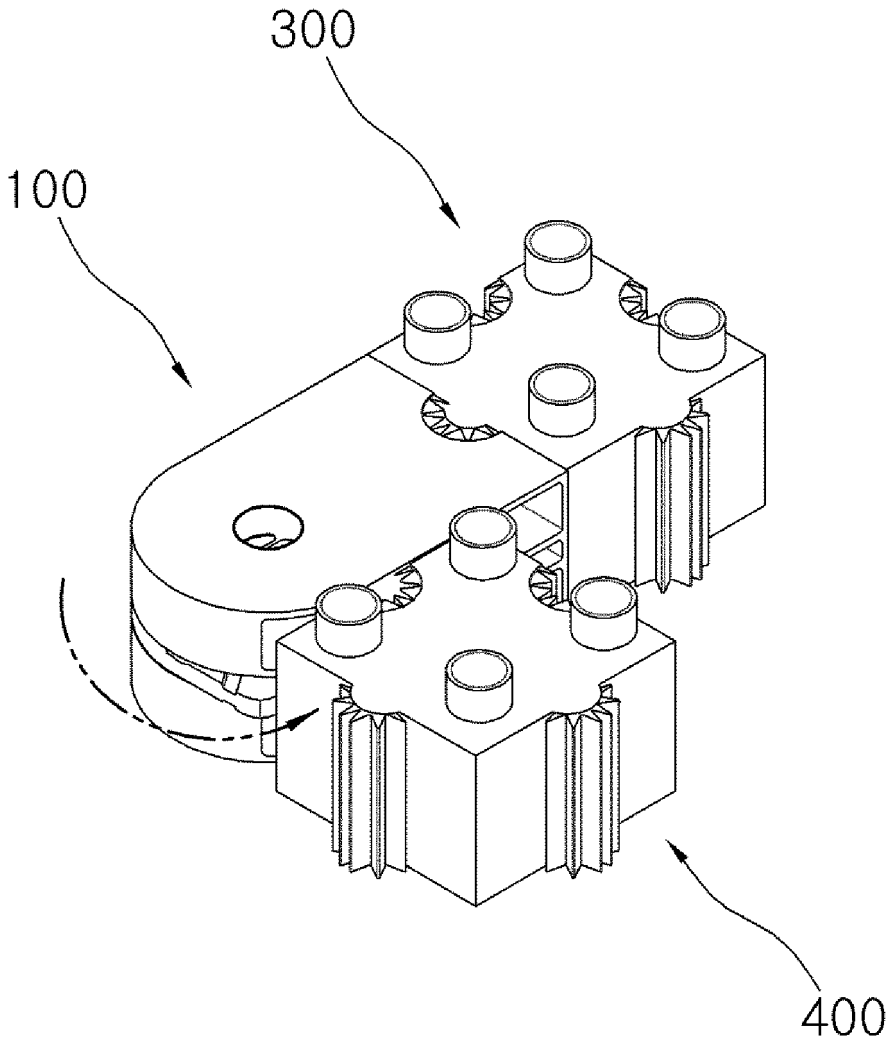

Fig. 6

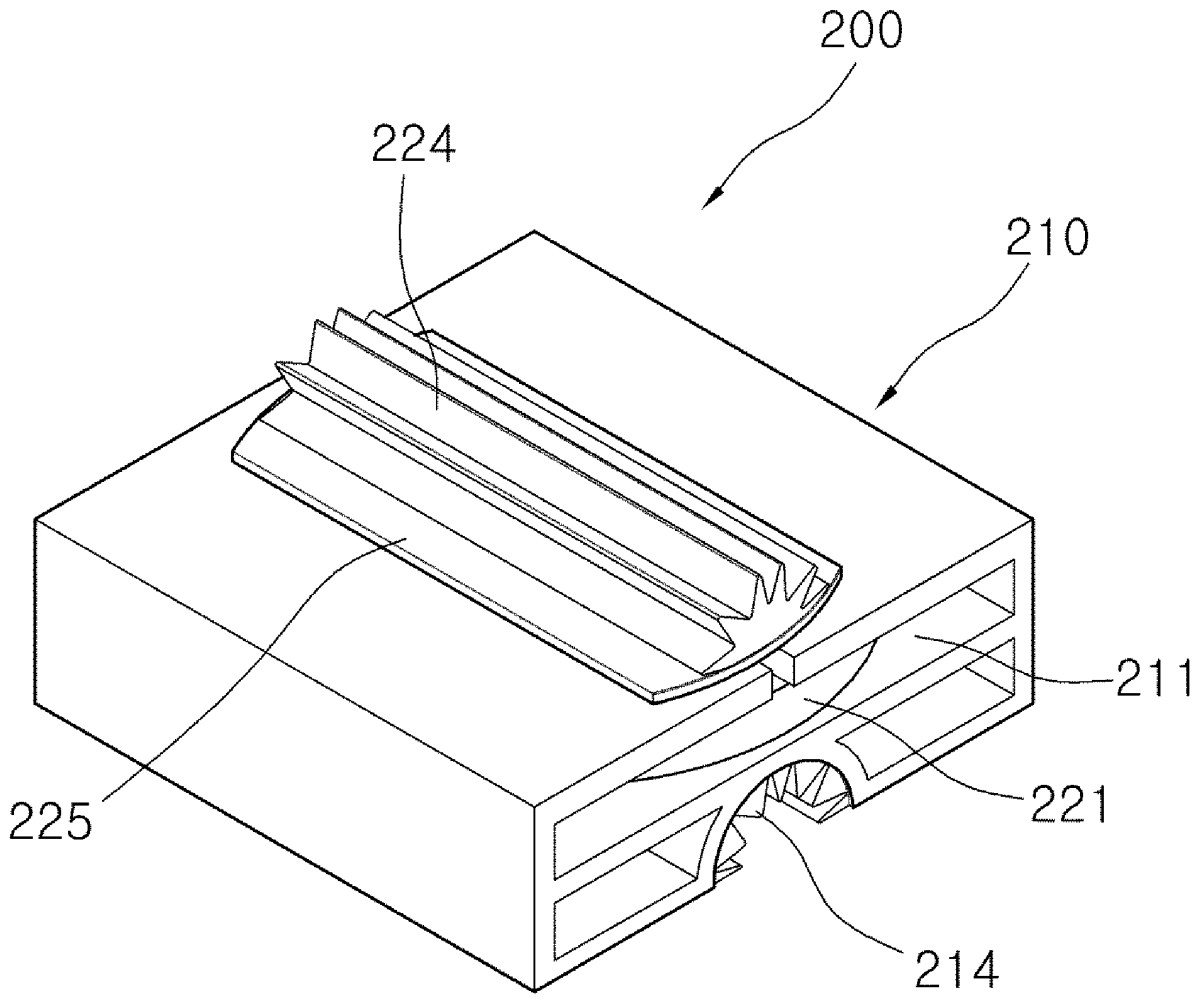

Fig. 7

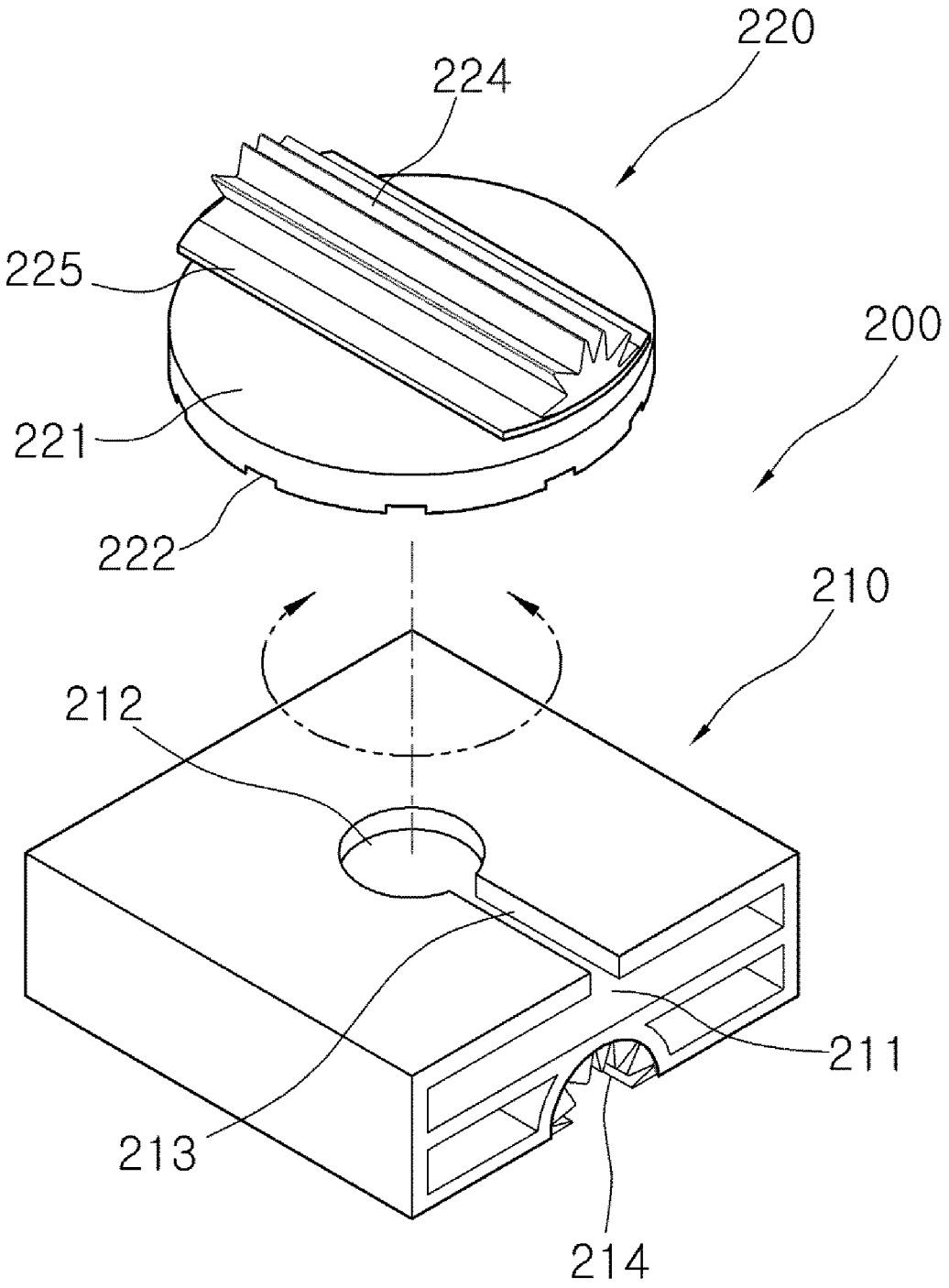

Fig. 8

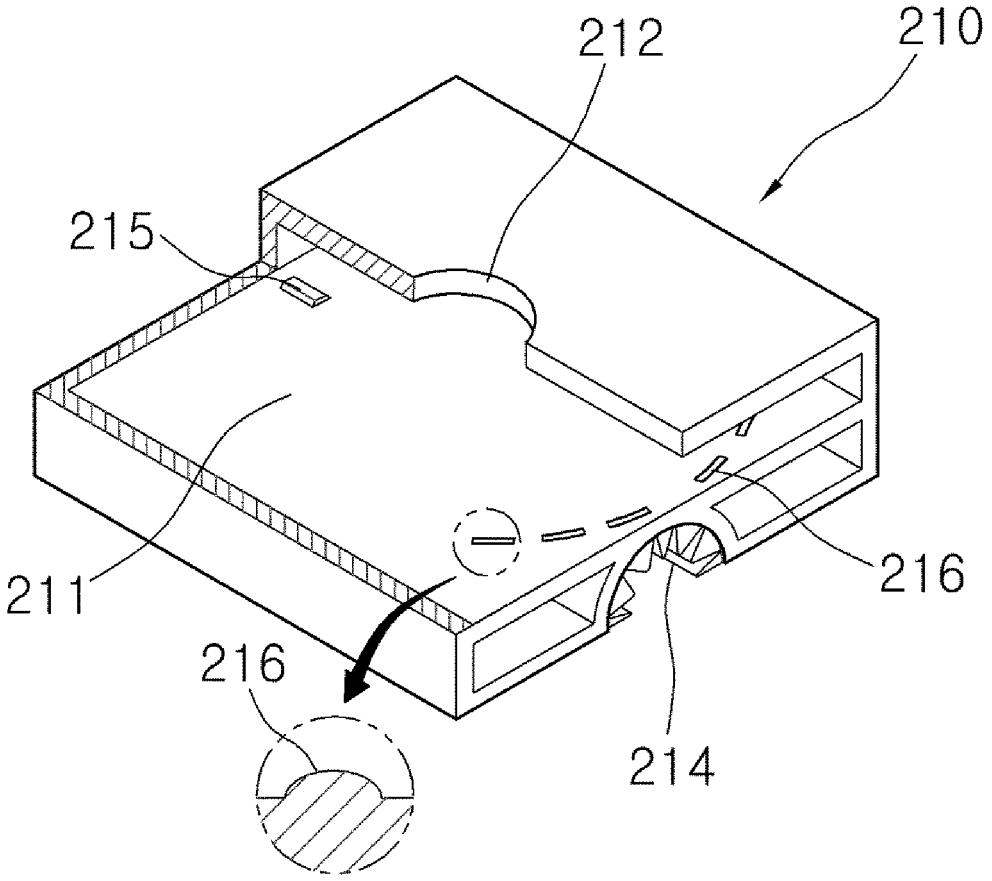

Fig. 9

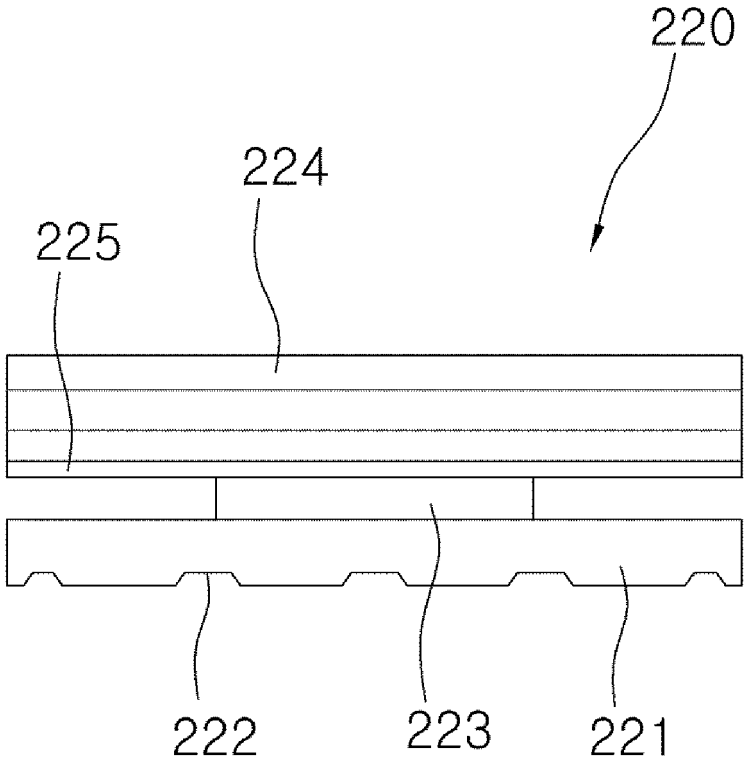

Fig. 10

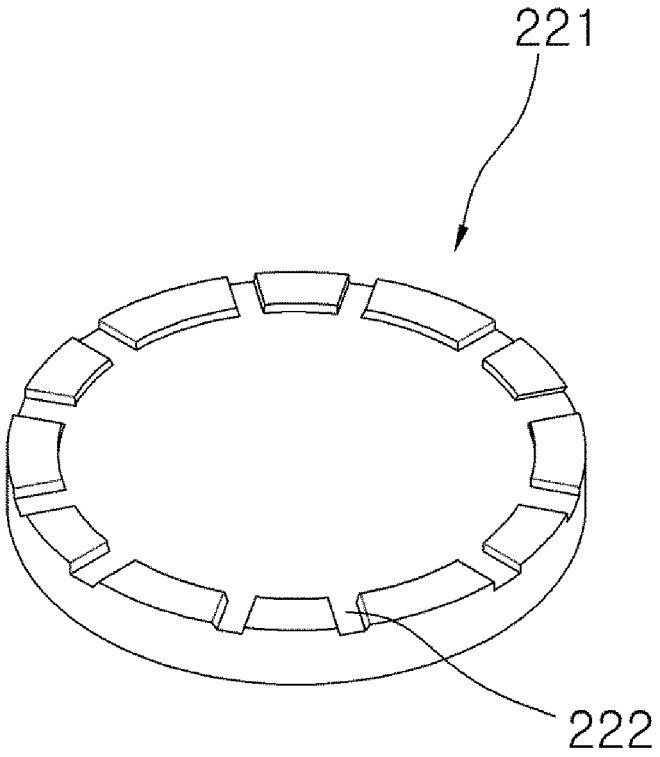

Fig. 11

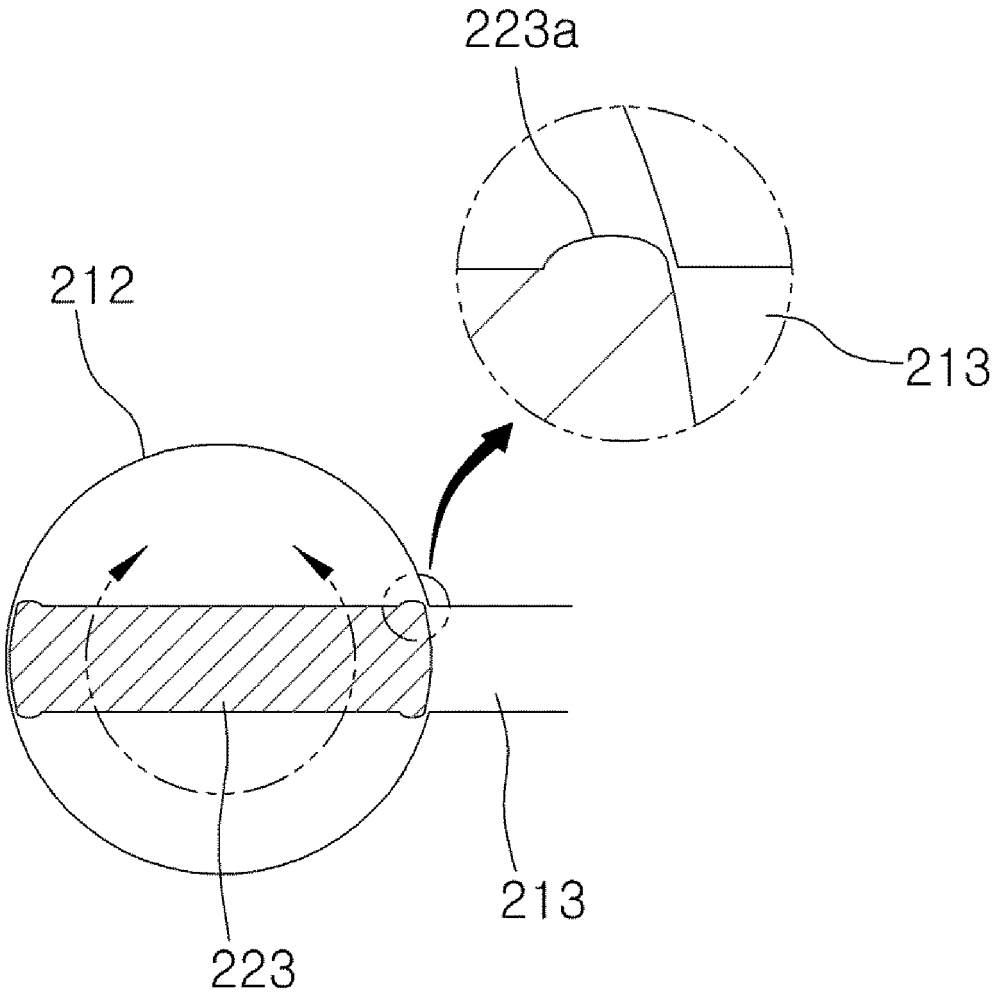

Fig. 12

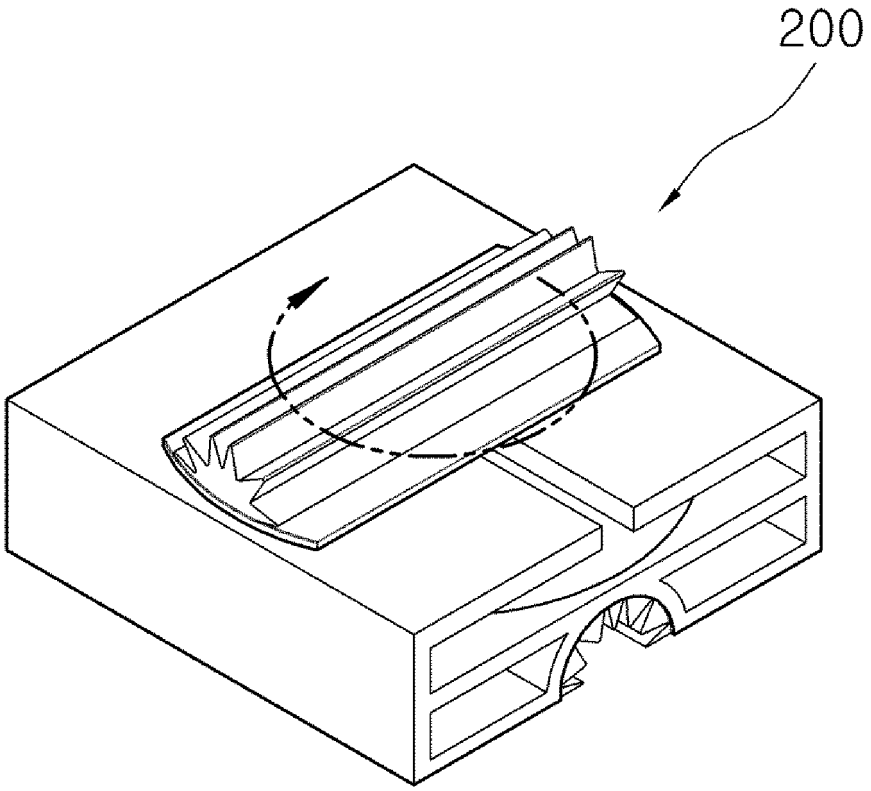

Fig. 13

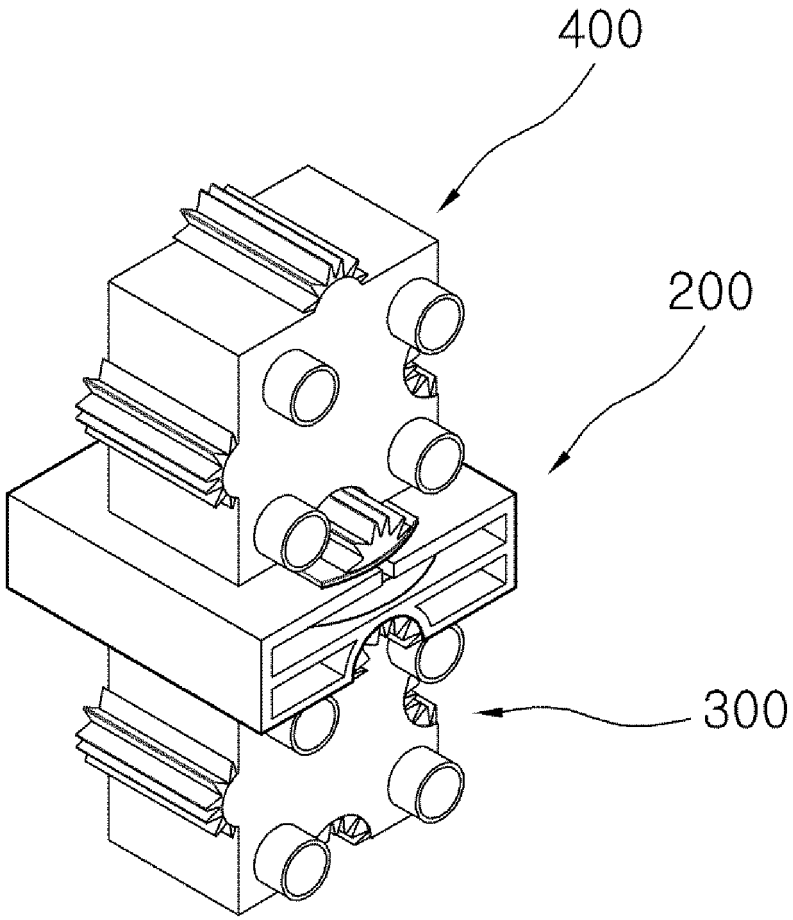

Fig. 14

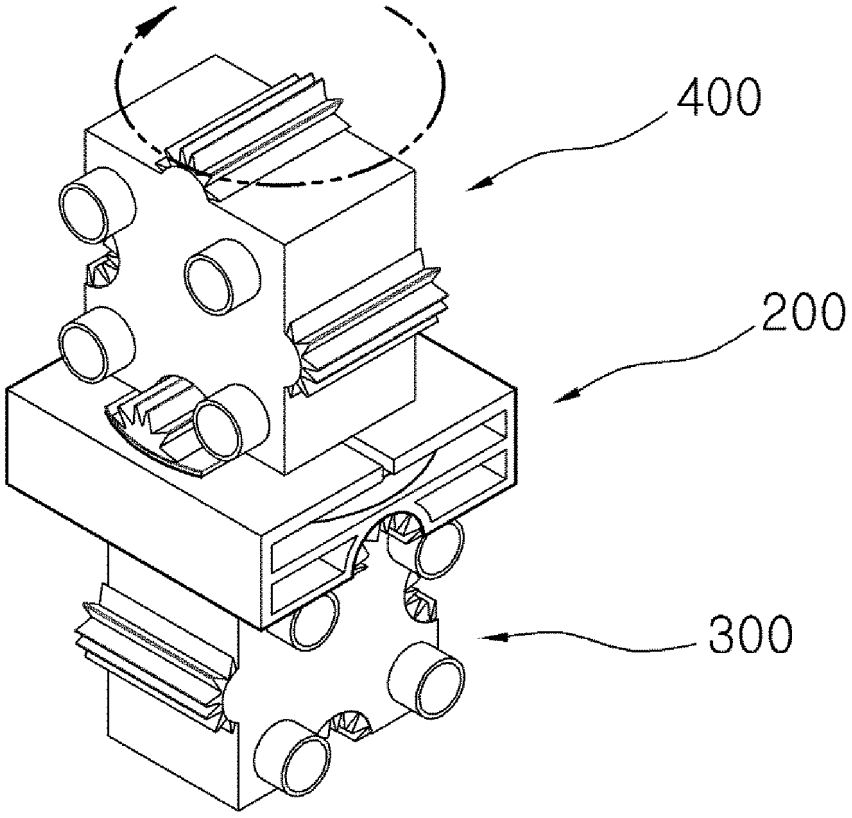

Fig. 15

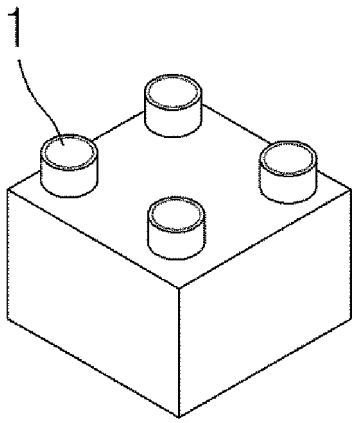

Fig. 16

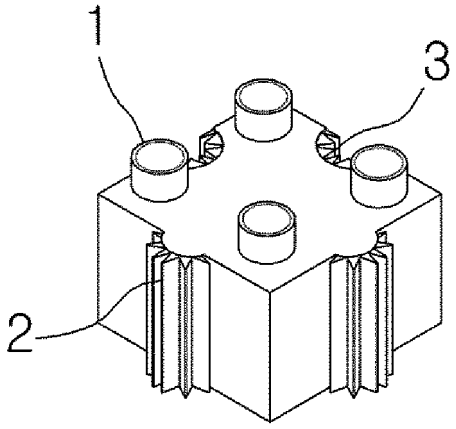

Fig. 17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2012/004468

A. CLASSIFICATION OF SUBJECT MATTER

A63H 33/04(2006.01)i, A63H 33/06(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A63H 33/04; A63H 33/08; A63H 33/26; A63H 33/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: "link", "swing", "block"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20-0178749 Y1 (RINGO CO., LTD.) 15 April 2000 See abstract, claim 1 and figures 1-10.	1-7
A	KR 20-0384320 Y1 (YOON, Bong Seok) 13 May 2005 See abstract, claims 1-4 and figures 6-11.	1-7
A	KR 20-0401684 Y1 (CHUN, Sun Woo) 21 November 2005 See abstract, claims 1-3 and figures 1-8.	1-7
A	KR 10-2011-0068132 A (CHUN, Sun Woo) 22 June 2011 See abstract, claims 1-4 and figures 1-9.	1-7

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search	Date of mailing of the international search report
20 SEPTEMBER 2012 (20.09.2012)	**21 SEPTEMBER 2012 (21.09.2012)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2012/004468

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 20-0178749 Y1	15.04.2000	NONE	
KR 20-0384320 Y1	13.05.2005	NONE	
KR 20-0401684 Y1	21.11.2005	NONE	
KR 10-2011-0068132 A	22.06.2011	CN 101890244 A WO 2011-074834 A2 WO 2011-074834 A3	24.11.2010 23.06.2011 23.06.2011

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